## Auditory and vestibular system visual system

Science, Biology



Auditory and vestibular System / Visual system

Auditory and vestibular System Visual system Auditory and vestibular system Question Sound waves are alternating high-and low-pressure regions travelling in the same direction through some medium. In the ear, the medium through which sound waves travels is the air. The origin of sound waves is from vibrating objects. The other component of sound waves is pitch. This is its frequency. A higher frequency of vibration means there is a high pitch while a lower frequency of vibration means there is a lower pitch. There is a range of sound that is heard most accurately by the human ear. Such sounds are from sources that vibrate at frequencies between 500 and 5000 hertz. The larger the size of the vibration, the louder the sound gets. Production of sound waves begins in the auricle. Its role is to pick and direct sound waves into the external auditory canal. The sound waves then strike the tympanic membrane. The difference in pressure of the air causes the membrane to vibrate in response. These vibrations are conducted by the chain of ossicles to the oval window that in turn transmits to the endolymph in the vestibular and tympanic canals. The endolymph vibrations vibrate the basilar membrane and its hair cells. The hair cells are then forced to bend against the tectorial membrane above them. Once they bend, they are stimulated to generate nerve impulses in the cochlear nerve to which they are connected. These transmits to the brain.

## Question 2

The otolithic organs have receptors for static equilibrium known as the macula. The receptors provide sensory information of the position of head in space. This is essential in maintaining the necessary posture and balance.

The receptors also play a significant role in detecting linear acceleration and deceleration.

## Question 4

The energy that radiates in terms of waves that radiates from the sun is known as electromagnetic radiation. Visible light is one of the types of this radiation. The radiation exhibits two peaks. The distance between these peaks is known as the wavelength. The wavelengths are measured in terms of nanometer (nm). The eye only detects visible light. This has wavelengths beginning from 400nm to700 nm. The visible light exhibits colors. Such color depends on its wavelength. A rod helps in seeing of dim light, as they do not provide color vision. On the other hand, the cones are stimulated by brighter light. This produces color vision.

## Question 7

The rod has light sensitive area. This is known as Rhodospin. This constitutes of opsin and retinal. Rhodospin absorbs the light that strikes a rod. It undergoes breakage known as bleaching into opsin and retinal. The change triggers generation of a nerve impulse in the receptor cell. This is then relayed to the optic centre of the brain. Rhodopsin is then reproduced to receive fresh photons. Rhodopsin is determined by the intensity of light reaching the eye. Hence, a dark-adapted eye has plenty of rhodopsins. In light adapted eye, most of the rhodopsin has been broken down. This is evident as one move from a well-lit house outside in the dark. It takes some time before the eyes adjust to the new environment. This is known as dark adaptation. The time taken is required for the rhodopsin level to revert to the original level. This helps in increasing the flexibility of the eye and hence we are able to see by sunlight.